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Effects of Reminiscence Interventions on Psychosocial Outcomes: A Meta-Analysis

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Running head: Effects of reminiscence

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Key words: life-review, controlled trials, depression, ego-integrity

Introduction

Reminiscence is defined as the process of thinking or telling someone about past experiences that are personally significant. Based on the suggestion by Erikson (1959) and Butler (1963) that reviewing one's life is a central task of old age, reminiscence has increasingly been used in older adults as a therapeutic mode for promoting self-acceptance and psychological health.

Different forms of reminiscence interventions may have different potential for solving these tasks. Recently, Webster, Bohlmeijer and Westerhof (2010) and Westerhof, Bohlmeijer, and Webster (2010) distinguished between simple reminiscence, life-review, and life-review therapy. Simple reminiscence is mainly unstructured autobiographical storytelling with the goal of communicating and teaching or informing others, remembering positive past events, and enhancing positive feelings. Relative to simple reminiscence, life-review is much more structured. Life-review usually covers the entire life span and is most often performed in a one-to-one format. Rather than simply describing past events (as in simple reminiscence), life-review focuses on the (re-)evaluation of life events and on the integration of positive and negative life events in a coherent life story. Finally, life-review therapy refers to the use of life-review with persons with serious mental health problems, such as depression. It is characterized by linking life-review to a clear theory of causal factors of depression or mental illness. Life-review therapy is focused on reducing bitterness revival and boredom and promoting a positive view on one's past. It often explicitly applies therapeutic techniques that have been developed in other therapeutic frameworks, such as cognitive therapy, problem-solving therapy, or narrative therapy.

Six meta-analyses have summarized effects of reminiscence. Large improvements of depressive symptoms have been reported by Bohlmeijer, Smit, and Cuijpers (2003: d=.84 standard deviation units, based on 20 studies), Chin (2007; g=.90 standard deviation units, 6 studies), and Pinquart, Duberstein, and Lynness (2007; g=1.00, 8 studies with depressed older adults). However, a recent meta-analysis on prevention of depression by Forsman,

Schierenbeck, and Wahlbeck (2011) did not find a significant effect of reminiscence (*d*=.24, based on 5 studies).

Effects on positive psychological well-being were smaller. Bohlmeijer et al. (2007) found moderate improvements of positive well-being (*d*=.54), based on 15 studies. Chin (2007) reported significant effects of reminiscence on positive affect (*d*=1.09, based on 6 studies) whereas no significant improvements were found with regard to life-satisfaction (*d*=.22, based on 5 studies) or self-esteem (*d*=.51, based on 6 studies). Finally, Woods, Spector, Jones, Orrell, and Davies (2005) did not find significant effects of reminiscence on cognitive performance of dementia patients at posttest (*d*=.27, based on 5 studies). However, participants in the intervention had higher cognitive performance at follow-up (*d*=.50).

Unfortunately, a large number of potential outcome variables were not addressed in these meta-analyses, such as ego-integrity, mastery, meaning of life, and social integration. In addition, most previous meta-analyses did not assess the effects of reminiscence at follow-up as well as effects of moderator variables. Furthermore, available meta-analyses did not test whether effects of reminiscence would also be found in young and middle-aged adults.

Thus, the goal of the present meta-analysis was to integrate the results of a larger number of controlled studies on a broader range of outcome variables at posttest and follow-up and to identify variables that moderate the size of the observed intervention effects.

Moderating effects of study characteristics

In order to have test power, the search for moderating effects of study characteristics was limited to the two most often assessed outcomes, depression and positive well-being.

Forms of reminiscence. Because participants in life-review therapy have elevated levels of depression or of other psychological symptoms (e.g., Webster et al., 2010) and because life-review therapy often integrates applies psychotherapeutic techniques, life-review therapy may show stronger improvement of depressive symptoms and positive well-being than other forms of reminiscence.

Health status at pretest. Lower pre-intervention levels of symptoms leave less room for improvement. In fact, Bohlmeijer et al. (2003) found stronger improvements of depressive symptoms if subjects showed elevated levels of depression at pretest. Similarly, individuals who are psychologically distressed because of a chronic physical illness or cognitive decline may show above-average improvements of psychological symptoms.

Format. Individual and group formats have unique advantages. Individual sessions can be easily adapted to the needs of the participant and he/she might be more willing to talk about critical experiences. However, a group format promotes social exchange with other group members. Thus, interventions held on a one-to-one basis may show above-average improvements of depression, and group reminiscence may show above-average effects on social integration. Nonetheless, effect sizes on depression and positive well-being did not vary between individual and group condition in meta-analyses of Bohlmeijer et al. (2003, 2007).

Number of sessions. Haight and Haight (2007) suggested that 6 to 8 sessions seem to be sufficient to review one's life. Bohlmeijer et al. (2007) did not find a moderating effect of the number of sessions on change in positive well-being.

Control condition. Because participants of placebo control conditions may show more positive change than those of no-treatment control conditions, the differences between improvements in the reminiscence and control condition would be smaller. Nonetheless, Bohlmeijer et al. (2007) found no significant differences between studies that used an active placebo and those that did not.

Age. Reviewing one's life and finding ego-integrity has been described as a developmental task of old age (Butler, 1963; Erikson, 1959), and older adults are more likely to use reminiscence for teaching others and death preparation (Webster & McCall, 1999). Thus, older adults may be more interested in reminiscence than younger adults. This might lead to larger intervention effects in older samples. However, Bohlmeijer et al. (2007) did not find larger effects of reminiscence in samples with a mean age of 80 years or above compared

to samples with a mean age of 68-79 years.

Gender. Webster and McCall (1999) observed that women are more likely than men to use reminiscence for remembering negative events and clarifying one's identity. Thus, women may benefit more from interventions aimed at finding meaning in life and accepting one's past. Nonetheless, Bohlmeijer et al. (2003) did not find a significant moderating effect of gender.

Residence. Bohlmeijer et al. (2007) found smaller effects of reminiscence on psychological well-being in residential care than in community-dwelling older adults. We tested whether Bohlmeijer's result could be replicated.

Publication status. Because studies with insignificant effects may be less likely to be published (Lipsey & Wilson, 2001), published studies may show larger effects than unpublished studies.

Study quality. Randomization, blinding of raters, use of a treatment manual of interventions, training of interventionists, treatment integrity, use of intent-to-treat analysis, and sufficient test power are criteria for the quality of the study (Cuijpers, Smit, Bohlmeijer, Hollon, & Andersson, 2010). Low study quality may cause random error rather than systematic error (Lipsey & Wilson, 2001). In fact, no moderating effect of the quality of the studies was found in the meta-analysis by Bohlmeijer et al. (2003).

Methods

Selection of studies

Studies were identified by search of electronic data bases (CINAHL, Google scholar, Medline, PsycInfo, Psyndex; search terms: (reminiscence or life-review or autobiographical storytelling or autobiographical writing) and (intervention or therapy or trial) and cross-referencing. In order to be included in the meta-analysis, a study had to

a) examine the effects of (simple) reminiscence, life-review, or life-review therapy
b) use a control condition that did not receive an active psychological treatment

c) use one or a combination of the following outcomes: depression, other psychological symptoms (e.g., anxiety), positive psychological well-being (e.g., life-satisfaction), ego-integrity, purpose in life, mastery, cognitive performance, social integration, and preparation for death
d) provide sufficient information for computing effect sizes, and
e) be published/ presented before November 2011.

From the identified 253 studies, 125 had to be excluded because they had no control condition (65), they were case studies (22), they did not provide quantitative data (10), the control condition was an active psychological treatment rather than a placebo condition (7), they duplicated results from other papers (7), the intervention condition combined reminiscence and other forms of psychological treatment (6), the study was not available by interlibrary loan (5), or insufficient information was provided for computing effect sizes (3). Finally, 128 studies were included in the present meta-analysis (see, Appendix I and II).

Measures

Depressive symptoms. Depression was assessed with the Geriatric Depression Scale (Sheikh & Yesavage, 1986; 37 studies), the Beck Depression Inventory (Beck, Steer, & Brown, 1996; 13 studies), the Center for Epidemiological Studies Depression Scale (Radloff, 1977; 11 studies), and other measures (21 studies).

Other psychological symptoms. These symptoms were measured with the State-Trait-Anxiety Inventory (Spielberger, Gorsuch, & Lushene, 1970; five studies), the Symptom Checklist SCL-90 (Derogatis, 1994; three studies), and other measures (15 studies).

Psychological well-being. Studies used the Life Satisfaction Index (Neugarten, Havighurst, & Tobin, 1961; 28 studies), the Self-Esteem Scale (Rosenberg, 1965; 22 studies), the Affect Balance Scale (Bradburn, 1969; 13 studies), and other scales (47 studies).

Ego-integrity. This variable was assessed with six different measures, such as the Ego-integrity Scale (Boylin, Gordon, & Nehrke, 1976; one study).

Meaning of/purpose in life. This variable was assessed with the Purpose in Life Test (Crumbaugh, 1968; four studies) and related instruments (seven studies).

Mastery. This variable was measured with the mastery scale by Pearlin and Schooler (1978; three studies) and related instruments (12 studies).

Cognitive performance. This variable was assessed with the Mini Mental State Examination (Folstein, Folstein, & McHugh, 1975; 15 studies) and related scales (11 studies).

Social integration. Social integration was assessed with measures of frequency and/or quality of social contacts (10 studies) and loneliness scales (13 studies).

Preparation for death. This variable was assessed with measures of (low levels of) death anxiety (e.g., Death Anxiety Scale; Templer, 1970; three studies), preparation for the end of life (Steinhauser et al., 2004; one study), and lack of denial of death (one study).

Study quality. A modified version of the checklist by Cuijpers et al. (2010) was used that assesses 8 criteria of study quality (e.g., randomization, training of therapists or group leaders). One criterion of the original checklist (meeting criteria for a clinical diagnosis) did not apply to our study. This criterion was replaced by the sum-category of lack of additional problems with study quality, such as problems with sociodemographic equivalence of intervention and control group. A sum-score was computed with higher scores indicating better quality.

Coded variables. We coded *type of reminiscence* (based on the criteria defined by Webster et al., 2010; 1=simple reminiscence, 2=life-review, 3=life-review therapy), *illness at pre*test (1=none, 2=depression, 3=dementia, 4=chronic physical disease), *number of sessions* (continuous variable), *format* (0=individual, 1=group), *control condition* (0=only testing/wait list control, 1=active placebo), *mean age* (continuous variable), *percentage of women* (continuous variable), *publication status* (1=published, 0=unpublished), residence (1=private home, 2=nursing home/residential care), *study quality* (continuous variable), and the *size of the statistical effects*. Based on 20% of the included studies, an inter-rater agreement of r=.89 was

established for continuous variables and of 90% for categorical variables. Differences were resolved by discussion.

Statistical Integration of Findings

Calculations for the meta-analysis were performed in five steps, using random-effects models and the method of moments (Lipsey & Wilson, 2001). A random-effects meta-analysis is appropriate if the effect sizes vary between studies beyond sample error, and not all sources of variation may be identified.

1. We computed effect sizes *d* for each study as the difference in the post-treatment measure between the reminiscence condition and control condition divided by the pooled standard deviation (*SD*). Positive scores indicate improvements. Outliers that were more than two *SD* from the mean of the effect sizes were recoded to the value at two *SD*.
2. Effect sizes were adjusted for differences in the outcome measures between the intervention group and control group at pretest and for bias due to overestimation of the population effect size in small samples (using Hedges' unbiased estimator *g* which is defined as $g=d*[1-\frac{3}{4*(n_1+n_2-9)}]$; Hedges, 1981).
3. Effect sizes were weighted by the inverse of their variance. Weighted mean effect sizes ($\overline{g}=\frac{\sum w_i g_i}{w_i}$) and 95%-confidence intervals (CI; $\overline{g}\pm1.96*SE(\overline{g})$); with SE being the standard error of $\overline{g}$) were computed.
4. Homogeneity of effect sizes was computed by use of the *Q* statistic, with $Q = (\sum w_i g_i^2) - \frac{(\sum w_i g_i)^2}{\sum w_i}$.
5. In order to test the influence of moderator variables, we used an analogue of analysis of variance and meta-regression. Differences between two conditions are interpreted as significant when the 95%-CIs do not overlap.

To interpret the practical significance of the results, we used Cohen's criteria. According to Cohen (1992), improvements of $d \geq .8$ are interpreted as large, of d=.50 as

medium, and of *d*=.20 as small.

Results

Eighty-two interventions provided simple reminiscence, 37 offered life-review and another 18 studies life-review therapy. Most studies offered reminiscence in a group format (90 studies). Seventy-five percent of the included studies randomly allocated the participants to the intervention and control condition (95 studies). Ninety-five studies were published. The interventions offered, on average, 10.1 sessions (*SD*=10.6, range 1 – 72) and lasted about 8.3 weeks (*SD*=7.7; range 1 – 78). Follow-up data were provided in 27 studies with a mean time interval of 22.9 weeks (*SD*=28.8, range 2 – 156 weeks) since the end of the intervention.

The 128 intervention studies provided results for 4,067 adults who received a reminiscence intervention and 4,337 control group members. The participants had a mean age of 73.1 years (*SD*=12.7; range 18.8-85.7 years); 66% were women, and 28% were married.

Average effect sizes for the outcome variables are provided in Table 1. At posttest, improvements of all outcome variables were statistically significant. Largest improvements were found for ego-integrity (*g*=.64), followed by depression (*g*=.57), purpose in life (*g*=.48), death preparation (*g*=.40), mastery (*g*=.40), mental health (*g*=.33), positive well-being (*g*=.33), social integration (*g*=.31), and cognitive performance (*g*=.24). As indicated by the non-overlap of the 95%-CIs, improvements of depression were larger than improvements of positive mental health, and cognitive performance. At follow-up, intervention effects persisted for 6 out of 9 main outcome variables (depression, other indicators of mental health, sum of indicators of positive well-being, ego integrity, cognitive performance, death preparation).

[Insert Table 1]

Recently Cuijpers et al. (2010) found some evidence for a publication bias in research on therapy for depressed adults which may lead to an overestimation of the effect sizes. In order to test for such a bias, we applied the trim-and-fill algorithm (Duvall & Tweedie, 2001). Applying this procedure led to lower estimations of improvements of ego-integrity (*g*=.50,

Z=1.98, $p<.05$) and life-satisfaction at posttest (g=-.01, Z=-.14, n.s.). However, effects of reminiscence on purpose in life (g=.73, Z=4.54, $p<.001$) and death preparation (g=.52, Z=2.95, $p<.01$) were even somewhat larger after applying the trim-and-fill algorithm. The lower improvement of life-satisfaction after application of the trim-and-fill algorithm may be based on the fact that studies on change in life-satisfaction with small samples often used a passive control condition (r=.21) which led to larger relative improvements after reminiscence (Table 2). Because the small number of included studies with small effect sizes seemed to be a result of the use of different study designs of published studies rather than of a failure to identify unpublished studies with low or even negative effects, we used the original data for the following analyses.

About 70% of the effect sizes were heterogeneous (Table 1). Therefore, we searched for moderating effects of study characteristics. As shown by the significant Q-statistic, intervention effects on depressive symptoms and positive well-being varied by the form of reminiscence (Table 2). Stronger effects were found in life-review therapy than in other life-review interventions and in simple reminiscence.

Change of depression also varied by the kind of diseases at pretest. Improvements of depressive symptoms were stronger in depressed individuals than in healthy and demented persons, and in individuals with chronic physical illness as compared to healthy individuals. However, diseases at pretest did not moderate the size of improvement of positive well-being.

Similarly, no moderating effects of format of the intervention (group versus individual format) or number of sessions were found. Change of positive well-being varied between studies with active versus passive control condition. Weaker relative effects of reminiscence were found in studies with an active control condition.

Levels of change of depressive symptoms and positive well-being did not vary by age, gender, forms of residence of the participants, and study quality.

[Insert Table 2]

The assessed moderator variables are not completely independent of each other. For example, most studies with dementia patients use simple reminiscence. Thus, we also tested whether the effects of significant univariate moderators would persist in multivariate analysis. A weighted multiple linear regression analysis was computed with life-review therapy (1=yes, 0=no), depression status at pretest (1=depressed, 0=not depressed), physical illness at pretest (1=yes, 0=no) as independent variables and change in depressive symptoms as dependent variable. In that analysis, only initial depression status (B=.75, β=.47, Z=4.06, p<.001) and physical illness at pretest (B=.62, β=.28, Z=2.98, p<.01) were significant moderators. As only one significant moderator of improvement of positive well-being has been identified, there was no need for a multivariate analysis with regard to this variable.

Due to the smaller number of available studies, we did not compute the full set of moderator analyses for the other outcomes. However, because benefits of reminiscence on social integration may be larger in interventions with group format than with one-to-one format we tested whether this would be the case. Because the only available meta-analysis on effects of reminiscence on cognitive performance focused on dementia patients (Woods et al., 2005), we also tested whether cognitive intact individuals would benefit from reminiscence with regard to cognitive outcomes as well. We did not find a moderator effect of group format on change in social integration (Q(1,22)=.61, n.s.). The moderating effect of dementia status on change in cognitive performance was also not significant (Q(1,27)=3.22, n.s.). Nonetheless, significant improvements of cognitive performance were only found in individuals with cognitive impairment (g=.33, Z=4.00, p<.001), but not in cognitively intact persons (g=.12, Z=1.37, n.s.).

Discussion

The present meta-analysis found positive immediate effects of reminiscence interventions on all assessed outcomes. Effects on depression, other indicators of mental health, positive well-being, ego-integrity, cognitive performance, and death preparation were

maintained at follow-up. In addition, effect sizes on depression and positive well-being varied, in part, by form of reminiscence, symptoms at pretest, and kind of control condition. We start the discussion with a comparison of our results with those of previous meta-analyses.

The largest effect size of reminiscence on depression of previous meta-analyses (Pinquart et al., 2007) was exclusively based on studies with depressed older adults, and the present meta-analysis found a similar effect size for that group in a larger data set. Our observed effect on depression in individuals with no medical condition was similar to the effect size reported by Forsman et al. (2011) on preventive trials. Our mean effects on positive well-being were somewhat smaller than those reported by Bohlmeijer et al. (2007) and Chin (2007) with regard to positive affect in particular. Bohlmeijer et al. (2007) used Cohen's *d* rather than Hedges' *g*, which led to somewhat larger estimates (Lipsey & Wilson, 2001). In addition, as our analyses on positive well-being included more than 5 times more effect sizes than the two previous meta-analyses, we attained more reliable results.

The effect size on cognitive performance was very similar to that of a previous meta-analysis by Woods et al. (2005), although we found a significant effect already at pretest, probably because of higher test power. Thus, available results indicate that reminiscence can slightly improve cognitive performance of individuals with cognitive impairment, although they do not yet provide sufficient evidence for such an effect in cognitively intact individuals.

The present meta-analysis showed that reminiscence affects a broad range of outcome variables. The moderate effect of reminiscence interventions on ego-integrity supports Butler's (1963) suggestion that reminiscence interventions are a useful tool for the development of an accepting attitude towards one's own life. Unfortunately, there were too few studies to compare the effects of different forms of reminiscence on that outcome variable.

Although only six out of nine follow-up effects were significant, the effect sizes at follow-up were not smaller than those at posttest. Thus, the loss of effects at follow-up seems

to be based on the smaller number of available studies that provided follow-up data.

Few moderator variables had significant effects. The present meta-analysis is the first to show that life-review therapy has stronger effects on depression than life-review or simple reminiscence, and that this effect is explained by the higher levels of depressive symptoms of participants receiving life-review therapy at pretest. Interestingly, "non-therapeutic" life-review interventions did not differ in their effects on depression and positive well-being from simple reminiscence.

The present meta-analysis is also the first to find support for the assumption that patients with chronic physical illness benefit more from reminiscence interventions than healthy individuals, at least with regard to depressive symptoms. This effect may be based on their elevated levels of depression at pretest and/or on an emergent need to find ego-integrity because of limited remaining life-expectancy due to AIDS, cancer, or other severe diseases.

In line with Bohlmeijer et al. (2003, 2007) we found that the observed effect sizes did not vary between individual and group format and by the number of sessions. This indicates that one-to-one and group-based interventions work and that prolonging the intervention beyond seven sessions does not have an additional effect.

In contrast to Bohlmeijer et al. (2007), we observed larger relative improvements of positive well-being if the control condition did not receive any intervention as compared to a placebo intervention. This result indicates that non-specific interventions, such as socializing and discussion of current events, can also be a source of positive feelings.

Despite the suggestion that reminiscence may be a particularly useful intervention for older adults, the present meta-analysis did not find lower effect sizes on young or middle-aged adults than on older adults. Nonetheless, only about 6% of the available intervention studies focused on young and middle-aged adults, and some of them assessed individuals with severe physical illness (e.g., Ando, Morita, Akechi, & Okamoto, 2010), who may have a stronger need for reminiscence than their healthy peers. Thus, there is a need for more research on the

effects of reminiscence interventions on young or middle-aged adults.

The quality of the study did not moderate the size of effects. This indicates that our results are quite robust with regard to study quality.

Limitations and Conclusions

Some limitations of the present meta-analysis have to be mentioned. First, very limited numbers of studies were available for some outcomes (e.g., ego-integrity), subgroups (e.g., persons younger than 60 years), and for follow-up assessments. Second, we used broad categories of three forms of reminiscence. There were variations within these categories, for example with regard to theoretical background, level of structure, the biographical events addressed, and the therapeutic strategies. In addition, differences between interventions in the levels of structure and inclusion of evaluations of life are often gradual rather than categorical. Thus, other raters might have come to somewhat different conclusions regarding how some studies might be coded. Nonetheless, levels of interrater-agreement were satisfactory and the effect sizes for simple reminiscence, life-review, and life-review therapy were homogeneous, thus indicating that similarities of the effects within these conditions prevail. Third, we focused on main effects of moderator variables. Combining moderator variables would lead to small subsets of studies that lack test power for the identification of statistical significance. Fourth, no data were available for some moderators, such as whether individuals with unresolved biographical conflicts would benefit more from life-review than other persons. Fifth, we did not limit the included studies to those with highest quality. However, we were able to show that study quality did not moderate the size of the effects, which is a relevant result.

Nonetheless, several conclusions can be drawn from the present meta-analysis. First, we conclude that reminiscence interventions produce small to moderate improvements of depressive symptoms, other indicators of mental health, ego-integrity, positive well-being, purpose in life, mastery, cognitive performance, social integration, and death preparation.

Second, the largest effects on depressive symptoms can be expected when applying life-review therapy to depressed adults. Therapeutic effects for these interventions are similar to those observed for psychotherapeutic interventions with depressed older adults in general (Pinquart et al., 2007). Third, interventionists could either use simple reminiscence or life-review to promote positive well-being when not working with depressed adults. Fourth, more work is recommended on effects of reminiscence interventions on ego-integrity and death preparation, on reminiscence with younger adults, and on long-term effects on all assessed outcomes. In addition, more research is needed on who benefits most from reminiscence interventions, such as those with unresolved biographical conflicts and persistent regrets. Finally, with regard to practical consequences, our meta-analysis indicates that reminiscence is a worthwhile intervention that should be offered to older adults and other persons who are interested in remembering the past, reviewing their lives, and finding ego-integrity. However, we should have realistic expectations about the (low) effects as long as reminiscence is used with the goal of enhancing psychological well-being and quality of life or preventing problems rather than as therapeutic intervention with psychologically distressed individuals.

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Table 1. Average effects of reminiscence interventions at posttest and follow-up

Variable	*k*	*g*	95%-CI		*Z*	*Q*
Posttest						
Depression	92	.57	.44	.70	8.64***	367.32***
Mental health	29	.33	.16	.51	3.77***	64.29***
Positive well-being	101	.33	.23	.42	6.88***	258.23***
Life-satisfaction	55	.22	.09	.35	3.43***	116.19***
Self-esteem	39	.20	.07	.33	2.98**	67.18**
Positive affect	33	.41	.27	.54	5.86***	68.31***
Ego-integrity	10	.64	.22	1.06	2.99**	41.12***
Purpose in life	14	.48	.14	.82	2.73**	54.71***
Mastery	21	.40	.15	.65	3.16**	105.14***
Cognitive performance	28	.23	.11	.34	3.83***	32.90
Social integration	23	.31	.12	.50	3.23**	63.57***
Death preparation	5	.40	.09	.71	2.50*	3.44
Follow-up						
Depression	20	.50	.24	.76	3.76***	86.85***
Mental health	9	.39	.02	.77	2.06*	43.93***
Positive well-being	22	.32	.12	.52	3.14**	54.59**
Life-satisfaction	14	.36	.12	.60	2.91**	23.31*
Self-esteem	10	.26	-.00	.52	1.93	14.89
Positive affect	4	.22	-.04	.48	1.68	1.38
Ego-integrity	3	.98	.00	1.96	1.96*	13.08**
Purpose in life	3	.24	-.04	.53	1.67	.39
Mastery	6	.28	-.30	.86	.95	31.16***
Cognitive performance	11	.18	.01	.35	2.05*	8.34
Social integration	6	.15	-.25	.56	.74	14.75**
Death preparation	2	1.00	.04	1.96	2.05*	3.31

Note. * p<.05; ** p<.01; *** p<.001. *k*=number of treated subsamples; *g*=effect size (positive scores indicate improvements); 95%-*C.I.*=95% confidence interval of the effect size; *t*=test of significance of the effect size; *Q*=test of homogeneity of the effect size (significant values indicate heterogeneity).

Table 2. Influences of moderator variables on change in depressive symptoms and positive well-being at posttest

Variable	Depressive symptoms						Positive well-being					
	k	*g*	95%-CI		*Z*	*Q*	*k*	g	95%-CI		*Z*	*Q*
Form of reminiscence						23.56***						13.57*
Simple reminiscence	50	.52	.35	.68	6.13***	60.01	63	.24	.13	.36	4.21***	63.10
Life-review	27	.31	.09	.54	2.72**	19.36	32	.38	.21	.54	4.52***	30.88
Life-review therapy	15	1.28	.95	1.61	7.65***	13.81	5	1.02	.61	1.42	4.94***	8.13
Health conditions at pretest						32.64***						2.53
No	47	.31	.15	.48	3.75**	44.06	65	.28	.17	.40	4.76***	64.18
Depression	23	1.09	.85	1.33	8.73***	28.70	12	.48	.19	.77	3.21***	7.52
Dementia	12	.31	-.02	.65	1.86	4.67	14	.23	-.06	.51	1.55	12.13
Physical illness	10	.94	.56	1.31	4.85***	12.63	9	.61	.32	.91	4.05***	16.37*
Format						1.33						.65
Individual format	27	.69	.44	.94	5.42***	34.01	37	.36	.21	.52	4.55***	41.06
Group format	65	.52	.35	.68	6.17***	60.51	65	.31	.19	.44	4.93***	68.90
Number of sessions (median split)						.42						.39
≤ 7 sessions	39	.63	.42	.84	5.83***	39.97	47	.32	.18	.45	4.50***	46.11
> 7 sessions	51	.54	.35	.72	5.62***	52.56	51	.38	.24	.52	5.36***	53.56
Control condition[1]						1.57						5.12*
Active condition	37	.45	.23	.67	3.95***	41.73	46	.18	.04	.32	2.49*	33.43
Only tests/WLC	62	.61	.42	.80	6.84***	66.85	65	.39	.27	.52	6.06***	87.20
Age						2.84						.15
< 60 years	6	.68	.15	1.22	2.50*	5.08	11	.36	.08	.65	2.51*	6.62
60 – 80 years	59	.59	.42	.75	7.10***	66.11	54	.35	.22	.48	5.42***	65.90
> 80 years	22	.33	.06	.60	2.43*	18.18	28	.39	.22	.56	4.56***	22.59
Gender						1.44						.64

< 33% women	10	.71	.30	1.12	3.40***	8.53	12	.45	.15	.74	2.97**	13.55
33-66% women	19	.67	.37	.97	4.40***	14.59	18	.33	.08	.57	2.64**	8.27
> 66% women	52	.50	.32	.68	5.46***	60.45	59	.32	.19	.44	4.83***	67.40
Residence						1.83						1.46
Private home	42	.65	.45	.85	6.30***	43.64	41	.39	.24	.54	5.02***	33.92
Nursing home/residential care	43	.53	.33	.73	5.242***	47.75	47	.31	.17	.46	4.32***	59.70
Mixed forms	7	.32	-.15	.79	1.34	4.02	11	.19	-.11	.49	1.25	7.22
Publication status						.13						.20
Published	70	.58	.43	.74	7.28***	62.97	68	.35	.23	.46	5.79***	72.56
Unpublished	22	.52	.24	.81	3.56***	32.05	33	.30	.12	.47	3.32***	29.51
Study quality						2.62						3.72
Below median	33	.42	.19	.65	3.59***	26.40	38	.47	.30	.64	5.39***	39.94
Above median	59	.65	.82	1.21	7.68***	69.02	63	.27	.15	.38	4.47***	67.31

Notes. WLC = wait list control condition. [1] Separate effect sizes were computed in that analysis if the study included an active and a passive control condition. *k*=number of treated subsamples; *g*=effect size (positive scores indicate improvements); 95%-*C.I.*=95% confidence interval of the effect size; *t*=test of significance of the effect size; *Q*=test of homogeneity of the effect size. * $p<.05$; ** $p<.01$; *** $p<.001$.

Appendix I: Selected Characteristics of the Included Studies

Authors	$N_{reminisc.}$	$N_{control}$	Dropout rate	Randomiz.	Age	% women	Health condition	Form	Set-ting	# sess.	f-u	Outcomes
Afonso & Bueno (2010), Afonso et al. (2011)	30	60		yes	76.0	83	depression	LRT	I	5		EI, D, PIL, PWB, SI
Akanuma et al. (2011)	12	12	0	yes	78.4	75	dementia	SR	G	12		COG, D, SI
Ando et al. (2006)	15	21	0	no	53.0	80	phys. illness	LR	I	4		D, PWB
Ando et al. (2010)	34	35	10.4	yes	56.0	56	phys. illness	LR	I	2		DP, EI, MH, PIL
Arean et al. (1993)	27	20	25	yes	66.7	70	depression	LRT	G	12		D, EI
Arkoff et al. (2004)	18	18		no	65.5	100	no	LR	G	14		MA, PIL, PWB, SI
Arkoff et al. (2006)	30	36		no	18.8	83	no	LR	G	14		MA, PIL, PWB, SI
Baines et al. (1987)	20	10		yes	82.1	93	dementia	SR	G	20	4	COG, MH, PWB
Bass & Greger (1996)	4	8	0	no	68.5		dementia	SR	G	8		D
Bevis (2008)	24	24	17.1	yes	84.8	76.5	dementia	SR	G	6		D, MH, PWB
Blohm (1998)	14	26	11.1	yes	85.7	93	no	SR	G	8		D, DP, EI, MH, PWB
Bohlmeijer et al. (2008)	57	36	12.2	no	63.9	61	depression	LRT	G	8		PIL
Bohlmeijer et al. (2009)	64	43	13	no	64.0	75	no	LR	G	8		D, SWE
Bramlett & Gueldner (1993)	34	41	7.4	no	71.5	81	no	SR	G	3	9	SWE
Brooker & Duce (2000)	25	25	7.4	no	81.9		dementia	SR	G	2		PWB
Bryant et al. (2005)	43	22		yes	20.0	63	no	SR	I	14		PWB
Burnside (1990)	24	19		no	75.6	100	no	SR	G	8		PWB
Chao et al. (2006)	10	8	16.7	no	79.6	25	physical	SR	G	9		D, PWB

							dependence					
Chen (2011)	20	20		yes			phys. illness	LR	I	3		EI, PWB
Chiang et al. (2008)	36	39		yes	78.3	0	no	LR	G	8	4	PWB
Chiang et al. (2010)	45	47	30.8	yes	77.4	0	no	SR	G	8	13	D, MH, SI
Cho (2008)	19	21	26.3	no	44.4	0	no	LR	G	6		D, MH, PIL
Christopher (1986)	33	32	38.5	yes	76.6	58.5	dementia	SR	G	32	12	COG, D
Cook (1991)	14	18	22.2	yes	81.3	41.5	no	SR	G	16		D, PWB
Cook (1998)	12	24		yes	82.3	100	depression	SR	G	16		PWB
Cooper (1982)	12	15	15.6	yes	72.5	96	no	SR	G	12		PWB
Dai et al. (2010)	62	67	3.2	yes	70	58	depression	LRT	G	6		PWB
Daleo (1999)	13	13	7.1	no	75	69	depression	SR	G	9		D
Davis (2004)	7	7	22.2	no	68.5		stroke	LR	I	3		D, PWB
Dehkordi et al. (2009)	32	32	8.9	yes			no	SR	G	8		D
de Medeiros et al. (2011)	36	15	2.5	yes	80.6	64	no	SR, LR	G	8	34	COG, D, PWB, SI
Emery (2002)	18	8	38.6	yes	84.0	84	no	SR	G	8	8	D, MH, PIL, PWB, SI
Erlen et al. (2001)	10	10	9	yes	43.7	20	phys. illness	LR	I	4	52	D, PIL, PWB
Erlich (1979)	12	24		yes			no	LR	G	4		PIL, PWB
Feng et al. (2010)	62	67	3.2	yes	70	58	depression	LRT	G	6		D
Ferguson (1980)	15	15		no	81.5	100	no	SR	G	24		PWB
Fielden (1990)	15	16		no	74.7	74	no	SR	G	9		MH, PWB, SI
Fischer (1989)	21	11	8.6	yes	71.5		no	SR	G	12		D
Fry (1983)	108	54		yes	79.6	59	depression	LRT, SR	I	5		D, PWB, SI, SWE
Fry & Barker (2002)	20	18	5	no	30.5	100	no	SR	G	6		D, PWB, SWE,

Georgmiller & Maloney (1984)	34	29	0	no	74.6		no	LR	G	7		DP
Goldwasser & Auerbach (1996)	20	16	8.3	yes	83.1	72	no	SR	I	1		PWB
Goldwasser et al. (1987)	9	18	11	yes	81.6	82	dementia	SR	G	10	?	COG, D
Gonçalves et al. (2009)	11	11		yes	80.7	100	depression	LRT	I	4		D, PWB
Gudex et al. (2010)	127	137	26.8	yes	82.3	68	mixed	SR	G, I		26	COG, MH, SWB
Gurm (1990)	18	17	5.4	no	82.6	78	no	SR	G	8		D
Haight (1988)	16	35	15	yes	76	78	mobility impairment	LR	I	6		PWB
Haight (1989)	6	6	0	yes	74	67	no	LR	I	6		PWB
Haight (1992)	10	12	19	yes	76	78	depression	LRT	I	6	52	PWB
Haight & Dias (1992)	150	38	21.7	no	78	77	no	LR, SR	G, I	7		D, PWB
Haight et al. (1995)	6	10	11.1	no	77	100	no	LR	I	6		PWB
Haight et al. (1998)	104	97	20-47.6	yes	79.9	69	no	LR	I	6	44	D, PWB
Haight et al. (2000)	26	26	79.7	yes	79.6	69	no	LR	I	6	156	D, PWB
Haight et al. (2003)	7	7		no		60	dementia	LR	I	8		C, PWB
Haight et al. (2006)	15	16	0	yes	79.5	81	dementia	LR	I	6		C, D, PWB, SI
Hanaoka & Okamura (2004)	40	37	4.8	yes	81.6	86	no	LR	G	8	12	D, PWB
Haslam et al. (2010)	53	20	29.3	yes		81	dementia	SR	G, I	6		C, PWB
Hedgpeth & Hale (1983)	20	20		yes	76.3	80	no	SR	I	1		C, D, MH, SWE
Hoffman (2003)	5	5	0	no	46	100	cancer	LR	I			D, DP, PIL, PWB
Hosenfeld (1989)	8	8	23.8	yes	77.9	100	no	SR	I	6		PWB
Hsieh et al. (2010)	29	32	12.1	yes	77.9	62.5	dementia	SR	G	12		D

Hsu & Wang (2009)	24	21	6.2	yes	77.9	74	no	SR	G	7		D
Hughston & Merriam (1982)	28	28	21.4	yes	68.2	76	no	SR	I	4		C
Ito et al. (2007)	17	28	15	yes	82.9	56	dementia	SR	G	13		C
Karimi et al. (2010)	19	10	25.6	yes	70.5	56	depression	LRT	G	6		D
King (1978)	4	14	40	yes	66	25	no	SR	G	16		PWB
Koffman (2000)	23	6	12	yes	72.4	50	no	LR	G	8		D, EI, MH, PWB
Korte et al. (in press)	99	102	7	yes	63.5	80	depression	LRT	G	8	13	D, MH
Lai et al. (2004)	36	65	14.9	yes	82.6	78	dementia	SR	I	6	6	PWB, SI
Lappe (1987)	42	41		yes	83.3	88	no	SR	G	15		PWB
LaTour (1987)	8	9		yes	79.5		no	SR	G	8		PWB
Ligon (2007)	29	30	1.7	yes	81.1	77	no	SR	I	3	10	PWB
Lin (2010)	17	17	10.5	yes	77.6	57	dementia	LR	G	20		C, D, MH
Liu et al. (2007)	12	14	29.4	yes	74.7	17	no	SR	G	10		D, PWB, SI
Mandel (1988)	22	25		yes	78.1	13.6	no	SR	G	16		D, MH, PWB
Mannelli (1999)	38	36	14.9	no	71.2	76	no	SR	G	10		D, PWB,
Mastel-Smith et al. (2007)	15	16	6.1	yes	70.1	81	no	SR	G	10		D
Masten-McGilvray (1990)	33	17	17.5	yes	77.2	64	no	LR, SR	G	8	8	PWB, SI, SWE
McMurdo & Rennie (1993)	29	20	10	no	79.3	81	no	SR	G	63		C, D, PWB
Miller (1985)	15	33	25	yes	77.8		no	LR	G	8	26	D, PIL, PWB
Mitchell (1989)	38	34	10	yes	75.6	71	no	SR	G	4		PWB
Mohammedzadeh et al. (2011)	18	18		yes			no	LRT	I			D
Morgan (2000), Morgan &	8	9	0	yes			dementia	LR	I	12	6	C, D, PWB

Woods (2010)											
Namazi & Haynes (1994)	5	10		no	81	100	dementia	SR	G	12	C
Nomura (2009)	40	40		yes	82.6	71	no	LR	I	5-6	D, PWB
Nomura & Hashimoto (2006)	22	26		yes	81.9	96	no	SR	G	8	12	D, EI, MH, PWB
Norris (2001)	25	48	6.4	yes	78.2	92	no	SR	I	4		PWB
Okumura et al. (2008)	8	8		no	84	100	dementia	SR	G	5		C, PWB
Parsons (1983)	41	47	22.9	yes	76.6	20.7	no	SR	G	5		PWB, SI
Pearson (2006)	13	12		yes	82	100	no	LR	G	6		D, EI, SWB
Pot et al. (2010), Westerhof et al. (2010)	79	74	4.8	yes	72.5	64.4	no	LRT	G	12	39	D, MH, PIL, PWB, SWE
Rattenbury (1993) study 1	76	101	25.5-43.7	yes	83	70	no	SR	G	55		PWB
Rattenbury (1993) study 2	7	8	11.8	yes	67	50	cognitive impairment	SR	G	8		C, PWB, SI
Rattenbury & Stones (1989)	8	16	8	yes		85	no	SR	G	8		D, PWB
Reddin (2006)	26	11	19.6	yes	81	97	no	LR, SR	G	7		D, PWB
ReVille (1996)	40	80	20	yes	72.4	70	no	LR	I	6		D, PWB
Richeson & Thorson (2002)	150	224		no	70.4		no	SR	G	8		PWB
Rybarczyk & Auerbach (1990)	56	50	0	yes	65.7	0	phys. illness	LR, SR	I	1		MH, SWE
Rybarczyk et al. (1993)	72	34		yes	65	33	phys. illness	LR, SR	I	1		PWB, MH, SWE
Scates et al. (1985)	17	17	16	yes	75.1	64	no	SR	G	6		MH, PWB
Schafer et al. (1986)	128	57		no		73.5	no	SR	G, I	12		PWB, SI, SWE

Serrano et al. (2004)	20	23	14	yes	75.8	83	depression	LRT	I	4		D, PWB
Shellman et al. (2009)	19	37	0	yes	72.6	77	no	LR	I	8		D
Shi et al. (2007)	36	38		yes			depression	SR	G	6		D
Siviş et al. (2005)	5	5		no	68	60	no	SR	G	6		PWB
Steinhauser et al. (2008)	12	18	54	yes	62	46	phys. illness	SR	I	3	2	D, DP, MH
Stevens-Ratchford (1993)	12	12	0	yes	79.9	67	no	SR	G	6		D, PWB
Stinson & Kirk (2006)	10	8	16.6	yes	81.8	100	no	SR	G	12		D
Stinson et al. (2010)	22	25	12	yes	82.5	100	no	SR	G	12		D
Su et al. (in press)	49	44	3.9	yes	77.4	29	phys. illness	LR	G	73		C, D
Tabourne (1995)	16	17		no	63		dementia	SR	G	24		PWB
Tadaka et al. (2000)	11	10	8.3	yes	83.3	50	dementia	SR	G			COG
Tadaka & Kanagawa (2007)	28	27	6.6	yes	84.2	70	dementia	SR	G	8	26	C, D
Tatchell et al. (2003)	49	42	9.9	no	78	81	no	SR	I	5		MH, SI
Taylor-Price (1995)	17	17		yes	78.2	100	no	SR	G	12		D, PWB
Thorgrimsen et al. (2002)	7	4	9.1	yes	79.6	57	dementia	SR	G	18		C, PWB
Tourangeau (1988)	13	12	0	yes	78.4	76	no	SR	G	8		D
Vaughan & Kinnier (1996)	10	19	50.9	yes	39.5	4	phys. illness	LR	G	6		D, DP, PIL, PWB
Wang (2005)	25	23		yes	79.5	40	no	SR	I	17		D, PWB
Wang (2007)	51	51	5.9	yes	79.8	53	dementia	SR	G	8		C, D
Wang et al. (2005)	46	48	13	yes	75.6	45	no	SR	I	17		D, PWB
Wang et al. (2009)	38	39	10.5	yes	79.3	47	dementia	SR	G	8		MH
Watt & Cappeliez (1996)	21	5	35	yes	66.4	54	depression	LRT	G	6		D
Watt & Cappeliez (2000)	27	13	35	yes	66.8	54	depression	LRT	G	6	13	D

Weiss (1994)	20	8	30	yes			depression	LRT	G	6	PWB
Wilson (2006)	30	15		no	77.3	76	depression	SR, LRT	I	24	D
Wu et al. (2011)	35	39	4	no	81.3	0	phys. illness	SR	G	12	D, PWB
Youssef (1990)	21	21	39	yes	65.7	100	no	SR	G	6	D

Notes. $N_{reminisc}/N_{control}$=number of completers in experimental and control condition. C=cognitive performance, D=depression, DP=death preparation, EI=ego integrity, G=group format, I=individual (one-to-one) format, LR=life-review, LRT=life review therapy, MA=mastery, MH=mental health (other than depression), PIL=purpose in life, PWB=positive psychological well-being, SI=social integration, SR=simple reminiscence. # sess.=number of sessions, f-u=follow-up interval (in weeks). Age and percentage of women refers to the reminiscence condition.

Appendix II: Studies Included in the Meta-Analysis

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